Phys 131 2016

Lecture 1

Handouts: Syllabus

Intro Survey – return by Wednesday

Roster – will appear on most days.

Physics question

Various objects can orbit or circumnavigate the Earth. Examples include:

- balloons
- aircraft (picture of GlobalFlyer)
- satellites
- moon

How can these objects do this without crashing into Earth?

- possibly the engines of the aircraft keep it aloft
  - ↳ but satellites don't need engines to stay in orbit
  - ↳ the moon does not need an engine.

How, specifically does the moon not crash into Earth?

- Introduce yourself to neighbors
- Discuss these questions → provide a reason for your answer
  → listen to neighbor's reason + try to find issues with it

Questions like this, to do with motion and the nature of the universe are typical in physics. The idea behind physics is to provide a relatively simple framework or theoretical structure that describes how the material world functions. There are several branches of physics, each dealing with distinct aspects of the physical world. This course will focus on classical mechanics (Newtonian mechanics) which is useful for describing motion of "ordinary" scale objects. Phys 131 will give you the basic concepts + techniques of classical mechanics. You will learn to:

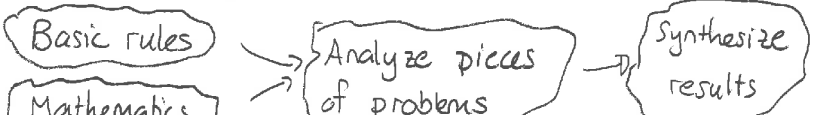
1) describe + understand motion using physical concepts plus mathematics
2) use mathematics such as algebra, trigonometry, vectors + calculus to "tell a story" about various physical situations
3) use a system of thinking that starts with a small number of basic ideas + rules and extrapolate from these to describe a wide range of physical situations

Why might this be relevant to you?

1) physics/engineering majors ⇝ basic building blocks of your discipline
   ⇝ cannot progress in discipline unless you understand these
   e.g. quantum physics supplants classical physics but uses ideas like energy/momentum...

2) other majors ⇝ some crossover between your discipline + physics (esp chemistry)
   ⇝ useful for understanding instrumentation

3) all majors ⇝ schematic reasoning



Perhaps Tuesday or Wednesday

Why is physics done at all?

1) curiosity – why does Moon not crash into Earth?
   - can one cool an object to absolute zero temperature?
   - is there a fundamental speed limit?

2) pratical – how do aircraft fly? How to build them?
   - how can one decide whether a building will be stable?

Some course details

1) syllabus – contact info
   - CMU email

2) course website – info
   - calendar page

3) D2L page – Tuesday

4) midterm / final exam dates – conflicts? resolve now.
   make ups? excused absences - limited time slots

5) this week

Tues – lecture / reading

Weds – discussion / probs → a) do before class
b) bring to class
c) no turn in
d) discuss in class

Supp Ex 1,2,3

Ch 2 Conc Q 4,6

Prob 1,2